



**Missouri Department of Natural Resources**  
**East Fork Grand River - WBID 0457**  
**Bacterial data by U.S. Geological Survey, 2000-2005**

Org	Site	Site Name	Yr	Mo	Dy	Flow	FC	E. coli	Recreational Season	
									Log FC	Log E. coli
USGS	457/25	E. Fk. Grand nr. Allendale	2000	5	17	0.25	140	210	4.94	5.35
USGS	457/25	E. Fk. Grand nr. Allendale	2000	7	12	9.3	340	110	5.83	4.70
USGS	457/25	E. Fk. Grand nr. Allendale	2001	5	1	71	2200	1700	7.70	7.44
USGS	457/25	E. Fk. Grand nr. Allendale	2001	5	3	61	680	650	6.52	6.48
USGS	457/25	E. Fk. Grand nr. Allendale	2001	7	12	12	880	62	6.78	4.13
USGS	457/25	E. Fk. Grand nr. Allendale	2001	9	19	8.7	340	930	5.83	6.84
USGS	457/25	E. Fk. Grand nr. Allendale	2002	5	8	75	1300	800	7.17	6.68
USGS	457/25	E. Fk. Grand nr. Allendale	2002	7	31	0.32	70	40	4.25	3.69
USGS	457/25	E. Fk. Grand nr. Allendale	2002	9	4	0.00499	160	98	5.08	4.58
USGS	457/25	E. Fk. Grand nr. Allendale	2003	4	29	5.6	230	490	5.44	6.19
USGS	457/25	E. Fk. Grand nr. Allendale	2003	5	21	10	110	180	4.70	5.19
USGS	457/25	E. Fk. Grand nr. Allendale	2003	7	16	0.67	480	300	6.17	5.70
USGS	457/25	E. Fk. Grand nr. Allendale	2003	9	4	0.34	290	130	5.67	4.87
USGS	457/25	E. Fk. Grand nr. Allendale	2004	5	19	180	32000	22000	10.37	10.00
USGS	457/25	E. Fk. Grand nr. Allendale	2004	7	8	14	180	120	5.19	4.79
USGS	457/25	E. Fk. Grand nr. Allendale	2004	9	9	44	1300	800	7.17	6.68
USGS	457/25	E. Fk. Grand nr. Allendale	2005	5	24	52	1200	900	7.09	6.80
USGS	457/25	E. Fk. Grand nr. Allendale	2005	7	7	6.2	140	67	4.94	4.20
USGS	457/25	E. Fk. Grand nr. Allendale	2005	9	15	1.2	680	670	6.52	6.51
								Log Mean	6.18	5.83
								Log Standard Deviation	1.4	1.49
								Sample Size	19	19

East Fork Grand River is a Class A whole body contact recreational water with a Fecal Coliform standard of 200 colonies/100 ml and an *E. coli* standard of 126 colonies/100 ml. These standards are for the geometric (log) mean of all bacterial samples taken during the recreational season, April 1 to Oct. 31. For *E. coli* bacteria, a water is judged to be unimpaired if the 60 percent Upper Confidence Limit (UCL) of the mean is less than the appropriate water quality standard. The formula for the 60 percent UCL is:

$$60\% \text{ UCL} = (\text{sample mean}) + ((0.253)(\text{standard deviation}) / (\text{square root of sample size}))$$

Bacterial data are normalized by natural log transformation and the UCL calculations for both Fecal Coliform and *E. coli* are shown below.

$$\text{Fecal Coliform 60 percent UCL} = (6.18) + ((0.253)(1.40)/4.36) = 6.26$$

$$E. coli \text{ 60 percent UCL} = (5.83) + ((0.253)(1.49)/4.36) = 5.92$$

$$\text{Antilog of } 6.26 = 523.21894$$

$$\text{Antilog of } 5.92 = 372.41171$$

Since the 60 percent UCL for both fecal coliform and *E. coli* bacteria exceed their respective standards, this stream is judged to be **impaired** by both fecal coliform and *E. coli* bacteria.